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11033 U.S. PTO  
09/851874  
  
05/09/01

# The United States of America



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*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this*

## United States Patent

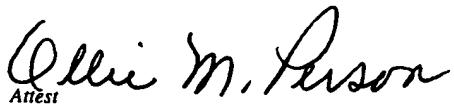
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Attest  
Ollie M. Larson



US005943448A

# United States Patent [19]

Tatsuta

[11] Patent Number: 5,943,448  
[45] Date of Patent: Aug. 24, 1999



[54] INFORMATION REPRODUCING SYSTEM,  
INFORMATION RECORDING MEDIUM,  
AND INFORMATION RECORDING  
APPARATUS

59-61383 4/1984 Japan.

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## [57] ABSTRACT

[21] Appl. No.: 08/764,136

A binarizing section generates binarized data from an image signal of a dot code on an information recording medium read by a code reading section. The binarizing section has a reference dot detection section, a dot area measuring section, a threshold value modifying section and a threshold value determining section. The reference dot detection section binarizes the image signal with a predetermined threshold value prior to generating binarized data to detect a reference dot from a binarized code image. The dot area measuring section measures the area of the reference dot detected by the reference dot detection section. The threshold value modifying section modifies the threshold value for binarization in such a manner that the area measured by the dot area measuring section approaches a predetermined target value. The threshold value determining section binarizes the image signal with the threshold value modified by the threshold value modifying section.

[22] Filed: Dec. 12, 1996

## [30] Foreign Application Priority Data

Dec. 25, 1995 [JP] Japan ..... 7-336800

[51] Int. Cl.<sup>6</sup> ..... G06K 9/38; G06T 7/60

[52] U.S. Cl. ..... 382/270; 382/286

[58] Field of Search ..... 382/270, 286,  
382/312, 321, 317, 287; 358/465, 466

## [56] References Cited

### FOREIGN PATENT DOCUMENTS

0 670 555 A1 9/1995 European Pat. Off.  
0 717 398 A3 6/1996 European Pat. Off.

24 Claims, 50 Drawing Sheets

